

# INTERNET DIFFUSION AND ADOPTION WITHIN ARAB-PALESTINIAN SOCIETY IN ISRAEL

By

ASMAA N. GANAYEM

*Al-Qasemi College of Education (ISRAEL)*

### ABSTRACT

*This study aims to explore the nature of Internet access and use within Arab-Palestinian society in Israel. The research focuses on two points: (i) examining the pace of Internet growth during the last decade and studying the nature of the digital gaps within the studied society in a specific time, (ii) studying the extend of the effect of cultural factors in comparison to demographic factors on Internet diffusion and adoption. Measuring the digital gaps uses a new tool to measure different facets of Internet diffusion and adoption: nature of Internet access (duration of access, use locations) and nature of use (frequency, variety of use, type of use and language/s used when surfing).*

*Arab-Palestinian society in Israel is a minority that has been distanced from the Israeli mainstream because of ongoing Israeli-Palestinian tensions. Wide gaps exist between Arabs and Jews in Israel in different socio-economic aspects. These gaps exist also in the diffusion of the Internet. This study examines the effect of various demographic (such as age and gender) and cultural (such as residency and religion) factors on Internet use and the position of cultural factors among all these factors.*

*This study used data from the CBS (the Israeli Central Bureau of Statistics) to track the development of Internet diffusion in the Israeli society, while for studying the digital gaps within the Arab society the study used data provided to the researcher by the Rikaz Center, which carried out the most exhaustive and representative interview survey of Arab-Palestinians in Israel in 2007 (Rikaz data, 2008).*

*This study can be considered an important representation of the state of Internet diffusion and adoption at a specific time and can serve as a reference for researchers and policymakers regarding the development of Internet diffusion and adoption within Arab-Palestinian society in Israel. In addition, studying the effect of various demographic and cultural factors can contribute to the understanding the digital divide and the information society in general. Moreover, the studied population is known for its complex and unique socio-political situation, which makes it of special interest with respect to indigenous minorities.*

*Keywords: Digital Divide, Information Society, Diffusion Of Innovation, Education, Arab-palestinians In Israel.*

### INTRODUCTION

The Internet is an integral part of people's everyday lives and it is in use by more than 30% of the world's population. People who have access to the Internet and possess the skills to use it are better informed and have more opportunities for social, political and economic progress, while those who do not have access or usable resources are at a disadvantage (Carrier, 1998; McNutt, 1998; Neu, Anderson & Bikson, 1999). The circular relationship between innovation adoption and cultural and socioeconomic status is complex, and these factors seem to have a

reciprocal effect. This study attempts to further understanding of how the Internet is adopted within a specific cultural context by studying its diffusion and adoption within Arab society in Israel in light of various individual and cultural indicators.

The first Section provides a brief description of the sociopolitical context of the studied population–Arab-Palestinian society in Israel (hereinafter referred to as Arabs or Arab society). The second section offers a short review of the Diffusion of Innovation (DOI) theory (Rogers, 2003), which frames the theoretical model of this study. Then

background is provided on Internet diffusion and adoption, with special emphasis on the state of the Internet in Israel.

## *Arab-Palestinian society in Israel*

Arab-Palestinian society in Israel encompasses the descendants of the approximately 10% of Palestinians who remained in the western part of historical Palestine after the establishment of the State of Israel in 1948. Since then, the ongoing conflict between Arabs and Jews over the rights to and authority over resources and land has generated continuous tension. Today about 7 million people live in Israel, with Arab-Palestinians comprising about one-fifth of Israel's population (Israel Social Survey 2010, 2011). Members of Arab-Palestinian society in Israel are distinguished nationally, religiously and culturally from the Jewish majority and are in a difficult position because of the continuous and deep conflict between Israel and the Palestinians (including those in the Palestinian Authority and refugees) (Al-Haj, 2004; Ali, 2006; Ghanem, 2001). This complicated context of being both Palestinians and citizens of Israel generates turbulent and wary relations between Arab society and Israeli institutions. Al-Haj (2004) described the situation of this society as double peripheral: marginalized by Israeli society, which defines itself as a Jewish State, and marginalized by the bigger Palestinian and Arab society due to Israeli citizenship.

Arab society is heterogeneous in terms of religion (Muslims 82.6%, Christians 8.7% and Druze 8.4%) and place of residence (north, center and south, rural vs. urban, and mixed Jewish-Arab towns vs. homogenous Arab towns and villages). Arabs and Jews usually live separately, and their lives differ substantially. Gaps in education and in standard of living between Jews and Arabs are especially large (Al-Haj, 2004; Ghanem, 2001). Contact with the Jewish population exposes Arabs to bilingualism and biculturalism, facilitating their exposure to communication media in Arabic and Hebrew (Smoocha, 1989). Standards in education have been positively affected by contact with the Jewish majority, but economic change have been less affected. Ali (2006) identified a strong trend toward a return to religion in the last two decades, mainly among Muslims.

The special context of Arab society in Israel as a heterogeneous minority on the political margins that has

experienced an identity crisis and has interacted with Jewish society and Jewish authorities seems to generate unique and possibly interrelated cultural values and practices, especially when studying modern developments.

## *Diffusion of Innovation*

This study uses Rogers' Diffusion of Innovation (DoI) (Rogers, 2003) theory as a framework to assess Internet diffusion and adoption. DoI has been widely used as a theoretical basis, especially in IT (Information Technology) research, for describing, analyzing and predicting innovation, diffusion and adoption processes.

*Adoption* of an innovation refers to *the decision to make full use of it* (Rogers, 2003). The cumulative number of adopters follows an S-shape distribution, Rogers used it to assess the size of each adopter category as follows: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%) (5; p.281). Rogers makes several generalizations about this distribution: "Earlier adopters are no different from later adopters in age." "Earlier adopters have more years of formal education than do later adopters." "Earlier adopters are more likely to be more literate than are later adopters." "Earlier adopters have higher social status than do later adopters" (Rogers, 2003). Furthermore, Rogers referred to the state of adoption at a specific time as the "rate of adoption," which can be measured by the number of adopters of a specific innovation within a specific period. The present study analyzes the rate of adoption in reference to home access and use, and offers a more in-depth analysis of rate of adoption with respect to use pattern and access characteristics.

DoI theory has been very useful in ICT (Information and Communication Technology) research on various technological developments (Fichman, 1992; Rhee & Kim, 2004; Maitland & Johannes, 2001). Maitland and Johannes (2001) applied Rogers' theory in their study of global diffusion of the Internet. They found that economic and infrastructure factors were more predictive of the domestic growth of the Internet than were cultural factors. Tang and Ang (2002) studied the diffusion of ICT in Singapore in light of Rogers' theory and found that the communicated attributes of an innovation within a social

system have much more impact than the characteristics of that innovation. Internet diffusion and adoption was also studied by Rhee and Kim (2004) based on DoI in South Korea. Criticism of DoI theory is also prevalent in the literature [Melkote, 2003], but the theory nevertheless seems useful for such studies.

### *Internet Diffusion and the Digital Divide*

The diffusion of the Internet is considered to be the most rapid technological innovation in history (Rogers, 2003). About 30% of the world's population uses the Internet today, three times the percentage in 2002 (about 10%) (Internet World Stats, 2011). Internet services are widely used by people from different societies and play a central role in the economy, politics, and in everyday life. Yet some people continue to lag behind in using and benefiting from this technology. Internet use in general has increased overall, but the gaps in many cases have widened since the rapidity of progress differs significantly between societies and nations (Chen & Wellman, 2004).

Research on the digital divide has emerged to characterize the differences in rate of Internet access and use among different groups (NTIA, 2001). This issue has been widely studied both theoretically and practically (Chen & Wellman, 2004; Barzilai-Nahon, 2006; Dijk & Hacker, 2003; DiMaggio, Hargittai, Celeste & Shafer, 2004; Hoffman, Novak & Venkatesh, 1998). At first, the issue of access to information technologies was considered to be the entire problem of the digital divide, but later research has shown that even people who have access to a specific technology may still perceive it as unusable or difficult to use. These differences have been examined within and between different population segments, based on gender, age, income, occupation, education, country, and various cultural factors (Barzilai-Nahon & Rafaeli, 2004; Dijk, 2005; Cooper & Kimmelman, 2001). Dijk (2005) added that differences in skills and usage are likely to increase, even in the most developed countries and despite the relative equality in material or physical access to the Internet. Cooper and Kimmelman (2001) agreed that differential timing in access to information is a significant source of social inequality. A delay in connecting to the Internet is tantamount to a lack of participation at the appropriate

time in the development of the information age, therefore leading to a lack of representation. Chen and Wellman (2004) argued that digital divides have many manifestations and vary within and between countries. Various indices have been developed for measuring the digital divide, among them DIDIX, 4C model, and others (Chen & Wellman, 2004; Barzilai-Nahon, 2006; Barzilai-Nahon & Rafaeli, 2004; Grigorovici, Constantin, Jayakar, Taylor & Schemment, 2004; Husting & Selhofer 2004, Piper, 2009). Chen and Wellman (2004) proposed examining the digital divide from four perspectives: technological access, technological literacy, social access, and social use. Rice and Katz (2003) identified three kinds of digital divides; use/not use, veteran/recent, and continuing/drop out. Barzilai-Nahon and Rafaeli (2004) suggested an alternative measure for the digital divide that includes infrastructures, affordability, use, social and governmental constraints, socio-demographic factors, and accessibility (Barzilai-Nahon, 2006; Barzilai-Nahon & Rafaeli, 2004).

The rate of Internet adoption is the dependent variable in the present study. Based on the indices already presented, this study proposes the following as important dimensions for measuring and comparing the rate of Internet adoption: Internet access, use, nature of access, and nature of use, as elaborated in the method section. These dimensions cover the main types of digital divides mentioned previously and extend them by introducing other factors appropriate to the studied population during the selected time period.

### *Internet use in Israel*

Israel is seventh in the world in Internet access, about 74% of all households have broadband connection (Piper, 2009). This reported high access and use in Israel does not accurately reflect the state of Internet diffusion among the Arab minority in Israel (Ganayem, 2007; Ganayem, 2008; Ganayem & Rafaeli, 2009; Ganayem, 2012). While Arabs comprise about one-fourth of Israel's population, the most recent CBS statistics (Israel Social Survey 2010, 2011) show that Arab Internet users still comprise around 11% of all Israeli users, with a usage rate among Arabs of around 60% compared to 80% among Jews. The most exhaustive study of the digital gap between Arabs and Jews was published

in 2009, based on data measured in 2004 by Ganayem and her colleagues [Ganayem, Rafaeli & Axaiza, 2009]. This study revealed broad gaps in digital access and use as well as gaps within both societies between genders, age groups, educational levels, income rate and residency. The overall results indicated that the lowest Internet diffusion was among those who were less educated, older, had low incomes, were female, Muslim, and residents of the south. These users were more likely to use the Internet in educational institutions. Rafaeli (2009) examined use rates for different tools and purposes among Israeli users in the preceding 24 hours, and found the following: searching for information 94.4%, surfing news websites 91.5%, e-mail 81.5%, comparing prices online 75%, playing games 68.5%, chat 56.5%, bloggers 58.9%, e-banking 47.6%, eBay 29.8%.

Mesch and Talmud (2007) found that Arab adolescents used internet and cellular communication to maintain local relationships, while Jewish adolescents used these tools to expand their social networks as well. Nevertheless, as the study was based on interviews with only 18 Arab and 19 Jewish adolescents, it is difficult to generalize these results. Lemish and her colleagues (2009) found that Arab children used the Internet less frequently than Jewish children. Avidar showed that Arabs used chat services, blogs and music downloading websites more than Jews, while Jewish users had higher rates of use for e-banking, e-mail and online travel planning. These patterns of use were explained as reflecting more personal use among Arabs and more instrumental use among Jews (Lemish, Ribak & Aloni, 2009).

All statistics indicate a considerable gap between Arabs and Jews in access and in use. In most of these reports and studies, the size of the Arab-Palestinian's sample used was not sufficiently large to reflect the nature of Internet access and use. The current study provides an in-depth examination of the nature of Internet use within Arab-Palestinian society in Israel.

## Research Questions and their Importance

The main research questions are:

- What is the nature of Internet access and Internet use among Arab-Palestinians in Israel? Which gaps exist

within this society?

This question deals with the development of Internet use within the Arab society in Israel in the last decade. It also allows a deeper insight with the different facets of Internet diffusion and adoption in a specific time (2007). These facets include: the diffusion level of home Internet connectivity, location of use, Internet use, use variety (using the Internet for purposes of education, entertainment, e-mail, and chat) and type of use (entertainment vs. knowledge), and finally language used while surfing. Moreover, an analysis will be done to find out the nature of the digital gaps between the different segments of the Arab society.

- How do individual and cultural factors affect the rate of Internet adoption?

This question is concerned with the extent of the effect of cultural factors (cultural indicators and cultural values) in comparison to individual characteristics (demographic data) on the rate of Internet adoption. This question examines the effect of the different factors while controlling for all other independent factors. Rogers considered cultural values to have major effect on the adoption of a new innovation (Rogers, 2003).

This study can be useful to scholars, policymakers and practitioners whose work has an influence on this large Israeli minority. Moreover, by providing in-depth information about how a complex minority group adopts new technologies, the results of this research are likely to be of benefit to those studying other minority groups in Israel and around the world. In addition, since the ability to effectively adopt new technologies is often a key to promoting community welfare, the findings of this research can indicate weak points in the adoption process as well as point out weaker groups in Internet adoption, thus enabling policymakers to direct their support and activities to the appropriate groups. Moreover, the use patterns found in this study can also point to the need to broaden awareness of effective Internet use, which in turn can contribute to individual and social development.

## Method

The research questions of this study were examined based on two data sources; the CBS and the Rikaz data. CBS (the



Israeli Central Bureau of Statistics) performs a socio-economic survey (The Israel Social Survey) of a representative sample of the Israeli population on an annual basis. A portion of the results are available online for free (<http://surveys.cbs.gov.il/Survey/survey.htm>); The CBS survey includes questions regarding demographic data, cultural information and technology use. In this study, the data was used specifically to examine the development of Internet use.

The Rikaz data (2008) is used as a main source in this study. This data was provided to the researcher on a CD-Rom. Rikaz socioeconomic survey of Arab-Palestinians in Israel carried out in 2007 by the Rikaz center of the Galilee Society (Rikaz data, 2008). This survey is the most representative and professional scientific survey of Arab Rikaz society in Israel.

## Research Population

The research population consists of the Arab-Palestinian population of Israel. The sample of the CBS included two ethnic groups; Arabs (14.7%, N=1047), and Jews and others (85.3%, N=6064), with a representative sample. While in order to study the different segments within the Arab society a wider sample was needed hence the use of the Rikaz data, which is representative of the population in terms of religion, residency, age, gender, educational level, and income level (Rikaz data, 2008). The sample consists of 5434 interviewees from 3,190 different households, ranging in age from 10 to 99 (ME=31.22, MD=28.0, SD=16.6, Skewness=0.87).

## Dependent and Independent Variables

Table 1 summarizes the dependent and independent variables used in this study. To measure Internet diffusion and adoption, the following depending variables were defined:

**Access:** Participants were asked whether they had a computer with an Internet connection in their home (coded 0=no, 1=yes).

**Connection Duration:** For participants with Internet connection, this variable refers to the number of years they have had a home Internet connection.

**Access Locations:** This variable refers to the number of

locations available to users for Internet use: home, workplace, educational setting, Internet café, friends' homes, other (ranging from 1 to 4).

**Use:** This variable refers to whether or not participants used the Internet in the last month (coded as 0=no, and 1=yes).

**Use Frequency:** Internet users were asked how many hours per week (h/w) they used the Internet (categorized on a 5-point scale from 1 to 5).

**Use Variety:** This variable was computed as the number of positive answers for using the Internet for the following purposes or tools: e-commerce, knowledge, education, entertainment, chatting, email, sports, and news.

**Use Type:** The previously mentioned (in Use Variety) purposes and tools were categorized into two categories: knowledge type (e-commerce, seeking information, education and news) and entertainment type (games, chat and sport). The Use Type variable indicates the rate of Internet use for knowledge purposes vs. entertainment purposes. The Use Type was computed by subtracting the number of entertainment type uses from the knowledge type score, and adding 3 to the resulting values, so that the value range was 1-6, from 1=mostly entertainment to 6=mostly knowledge use. The value 3 indicates equal usage for both types.

**Surfing Languages:** The language used when surfing is an important factor with respect to Arab society in Israel. The mother tongue for Arab citizens of Israel is Arabic, while the language of the state is Hebrew and the dominant language of the Internet is English. The Surfing Languages variable refers to two factors: the prominent language used when surfing, and the number of languages used when surfing. Respondents were asked which language they preferred to use when surfing the Internet (1=Arabic, 2=Hebrew, and 3=English or others).

The independent variables are categorized into: demographic factors, cultural indicators and cultural values. In the current study, the following demographic factors were examined in relation to Internet diffusion and adoption: age, marital status, gender, income, and employment status. In addition, the following cultural indicators were selected: district, residency type, religion. The cultural values includes degree of religiosity and

maintaining traditions, importance of family and friends, cosmopolitanism, cultural participation and gender equality. All these factors were expected to affect the way the Internet is adopted. Table 1 summarizes the variables and their measurements.

## Results

Factor	Short description
<b>Demographic data</b>	
Age	5 scales: 1=10-19, 2=20-29, 3=30-39, 4= 40-49, 5=50+.
Gender	0=female, 1=male.
Education	5 scales: 0=none, 1=elementary, 2=junior high school, 3=secondary or matriculation, 4= post-secondary (college or university degrees).
Income	8 scales: 1=under 2,501, 2=2,501-4,000, 3=4,001-5,000, 4=5,001-6,500, 5=6,501-8,000, 6=8,001-10,000, 7=10,001-13,000, 8=over 13,000. Household income in NIS.
Employment status	1=employed, 2=not employed, 3=outside the labor force.
<b>Cultural indicators</b>	
District	1=North, 2=Haifa, 3=Center, 4=South.
Residency Type – Mixed/Arab	0=not Mixed (Arab), 1=Mixed.
Residency Type – Recognized/Unrecognized	0=not recognized, 1=recognized.
Religion	1=Muslims, 2=Christians, 3=Druze.
<b>Cultural values</b>	
Family Importance	0=low or moderate, 1=high. Refers to time spent with family (0=never or sometimes, 1=always). Changed from three levels to two categories, since the first category was small (7.4%).
Importance of Friends	0=low or moderate, 1=high. Refers to time spent with friends.
Gender Equality	3 scales: 0=low, 1=moderate, 2=high. Refers to sharing in household chores, relevant only among males.
Cosmopolitanism	4 scales: 0=very low, 1=low, 2=moderate, 3=high. Refers to the number of languages in which print media is read.
Cultural participation	0=no, 1= yes. Refers to taking part/attending at least one activity in the last 6 months: theatre, musical performance, cinema, museum, or sport.
<b>Dependent variables</b>	
Internet Access	0=no, 1=yes. Having a home Internet connection.
Internet Use	0=no, 1=yes. Used the Internet in the last month.
Connection Duration	6 scales: 1=within the last year, 2=two years ... 6=6 years or more. Number of years having a home connection.
Access Locations	4 scales: 1=one location ... 4=4 locations or more. Number of locations available for use.
Use Frequency	5 scales: 1=1-2h/w, 2=3-5h/w, 3=6-9h/w, 4=10-19h/w, 5=20+h/w. Number of hours weekly (h/w) using the Internet.
Use Variety	6 scales: 1=1 purpose ... 6= 6 or more purposes. Number of purposes or tools for which Internet was used.
Use Type	6 scales: 1=mostly entertainment use ... 6=mostly knowledge use. Using the Internet for knowledge vs. entertainment.
Surfing Language	0=Arabic, 1=Hebrew. Surfing in Hebrew vs. Arabic as prominent language.

Table 1. Variables used in regressions to analyze the Rikaz data

This section describes and analyzes the development of Internet use, the nature of Internet access and use, the digital gaps and extent of the effect of cultural factors (cultural indicators and cultural values) in comparison to individual characteristics (demographic data) on the rate of Internet adoption.

## The development of Internet use

Tracking the rate of Internet use for Arabs and Jews (Figure 1), shows that the digital gap widened until 2005, then narrowing slightly until 2009. A remarkable growth is witnessed since 2009. In last statistic reported by Ganayem (2012), a rate of about 70% was reported regarding Internet use within the Arab society in Mai 2012.

## The Nature of Internet access and Internet use

This section based on the Rikaz data, which captured the status of the Internet in 2007 with a wide sample that enables deep analysis within the Arab society.

*Access and Nature of Access:* About third of the households in the sample were connected to the Internet. Nearly half of the users reported having only one location of use (49%), usually their homes; 35.9% of the users reported having two locations; and 13.1% of participants reported having three locations of use. More than 60% of the users have been connected since 2003. Most Internet users reported that their main location of use was at the home (80% of the interviewees), with only 8.2% reporting work, 6.9% educational institutions, and 5% at homes of friends.

*Internet Use & Nature of Use:* The nature of use refers to *Use Frequency*, *Use Variety*, *Use Type* and *Surfing Languages*. Nearly 29.5% of the full sample reported using the Internet, with *Frequency of Use* measured by hours per week: ME=14.76, MD=6.0, SD=25.05, Skewness=2.82,

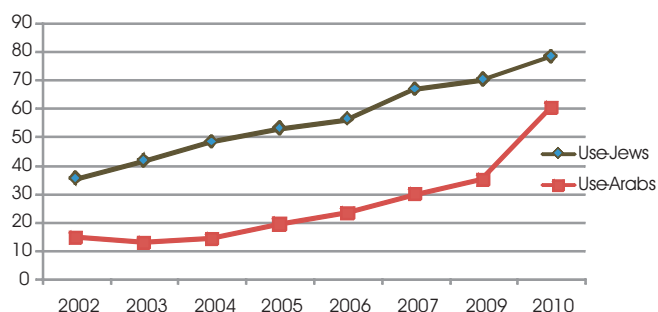


Figure 1. Rate of access and use among Arabs and Jews in Israel. Based on the CBS data

Range=0-99.

*Use Variety:* Figure 2 depicts the percentage of use for each Internet tool/service as well as the prominent purposes for which the tool/service is used. The range of this variable indicates the number of tools used: ME=3.5, MD=3.0, SD=1.41, Skewness=1.41, Range=1-6. These results indicate that most users use the Internet for three purposes. When it comes to prominent purposes for using the Internet, nearly one-third of the users reported using the Internet mostly for games, while nearly one-fifth reported information-seeking as their main purpose.

*Use Type:* The main purpose of use was categorized into two types: knowledge type and entertainment type. Nearly half of the users (49.3%) use the Internet mainly for entertainment purposes, while the other half (50.7%) use the Internet mainly for knowledge purposes. The results for this variable are ME=3.44, MD=3.0, SD=1.29, Range=1-6.

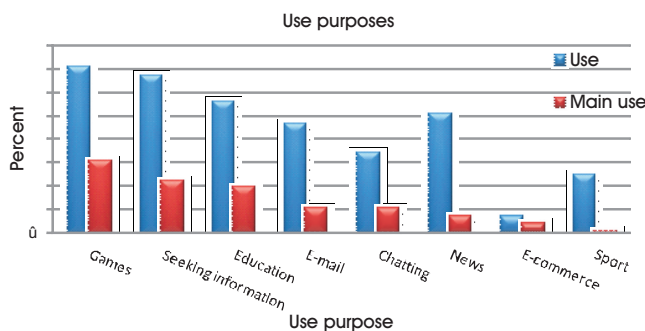


Figure 2. Purpose of Internet use

*Language:* Examination of the main language used when surfing the Internet shows that most users surf primarily in Arabic (69.9%), followed by Hebrew (26.7%), and English and other languages (3.4%).

## Digital gaps within the Arab society

Examination of the digital gaps among the different segments of Arab society in Israel shows differences in regard to Internet access and use for all of the independent variables. Digital gaps also exist in the nature of access (Access Duration, Access Locations) and the nature of use (Use Frequency, Use Variety, Use Type, Surfing Language), but not for all independent variables. Males, younger people, males, more educated, and higher income people were higher in Internet use and access. Table 2 summarizes these differences. Digital gaps in the nature of access were especially remarkable in the case of age, marital status, income, religion and cosmopolitanism. There were no significant differences in the nature of access based on gender equality and employment status. Regarding the nature of use, there are differences on all four nature of use variables based on marital status, Mixed/Arab, district, and cosmopolitanism. Differences in the nature of use among age categories, employment statuses and religious groups were significant in three of the four aspects of the nature of use. There also appear to be moderate differences (on two variables) in the nature of adoption based on education, income, family

	Access	Use	Connection Duration	Access Locations	Frequency of Use	Use Variety	Use Type	Surfing Languages
Age	***	***	*	*	N	***	***	***
Marital status	***	***	**	***	*	*	***	***
Gender	***	***	*	N	*	N	***	*
Education	***	***	*	N	N	N	***	***
Income	***	***	***	*	***	***	N	N
Employment status	***	***	N	N	**	**	N	***
District	***	***	N	**	***	***	*	***
Mixed/Arab	***	***	*	N	**	***	**	***
Recognized/ Unrecognized	***	***	!	!	***	N	N	*
Religion	***	***	***	***	***	*	N	***
Family Importance	***	***	N	*	N	N	***	***
Friends' Importance	***	***	N	*	***	N	*	***
Gender Equality	***	***	N	N	**	N	*	N
Cultural Participation	***	***	N	***	N	***	N	N
Cosmopolitanism	***	***	***	***	**	***	***	***

(N for not significant, ! for non-existents, \* for p<0.05, \*\* for p<0.005, \*\*\* for p<0.001).

Table 2. Results' Summary, for differences in Internet adoption

importance, and slight differences (difference in one variable) based on gender equality and cultural participation. Table 2 summarizes the significance of the gaps for each dependent and independent variable.

## The effect of cultural factors in comparison to individual characteristics

It is important to differentiate between, on the one hand, a description of existing digital divides based on a specific factors and, on the other hand, the effect of that factor while controlling all other factors.

Stepwise regressions were used for this purpose, and the results are summarized in Table 3. Age and education were the best predictors of Internet access and use, as younger and more educated participants were most likely to be connected and use the Internet. Income was found to be the main factor that affects connection duration and frequency of use.

The contribution of demographic data, cultural indicators and cultural values to different aspects of Internet adoption, was also tracked along the whole analysis reported previously. The result of these analyses is summarized in Table 4. Demographic data clearly explains the most differences in Internet access and use, as well as in Access Duration. In addition, cultural values and demographic data contributed the most to the explanation of the differences in Use Type and Use Variety. Using Hebrew as the main surfing language was explained mostly by cultural indicators.

## Conclusion

A review of the development of Internet use within the Arab society in Israel in the last decade, shows a rapid growth in Internet use, especially in the last three years. Digital gaps

	R <sup>2</sup>	Demographic	Cultural Indicators	Cultural Values
Access	0.384	0.275	0.054	0.055
Use	0.452	0.34	0.034	0.078
Connection Duration	0.176	0.124	0.047	0.005
Access Locations	0.08	0.017	0.031	0.032
Use Frequency	0.098	0.062	0.031	0.005
Use Variety	0.162	0.056	0.03	0.074
Use Type	0.231	0.105	0.009	0.117
Surfing Language-Hebrew	0.276	0.039	0.159	0.079

Table 4. Summary of the contributions of the demographic factors, cultural indicators and cultural values to the Internet adoption models

still exist in Israel in favor of the Jewish majority joining the socio-economical gaps, that exist since the establishment of the state of Israeli.

The Arab-Palestinian minority in Israel, uses the Internet mainly at home for entertainment purposes and less for work or for e-commerce purposes. This finding reflect the difficulty of integrating the Arab population in the Israeli workforce. The use of Arabic and Hebrew languages while surfing, seem to reflect the dual belonging: to the larger Arab world on the one hand as their cultural context and to the Israeli society as Israeli citizens on the other hand.

Digital gaps exist based on the most demographic and cultural factors. While, examining factors underlying these differences - age, income and education emerged as significant factors in most of the analysis, especially for access, use and the nature of access.

It is also remarkable that in general, demographic factors were the most predictive of the basic variables of the digital divide - access and use, while cultural factors had a weaker influence. Cultural factors were more predictive of the nature of access and the nature of use.

## Discussion

This study examined Internet diffusion and adoption within

Access	Use	Connection Duration	Access Locations	Use Frequency	Use Variety	Use Type	Surfing Language-Hebrew
R <sup>2</sup> =0.384 Age, education, cultural participation, district, income, Mixed/Arab, (cosmopolitanism, Recognized/Unrecognized, gender, employment, friends' importance).	R <sup>2</sup> =0.452 Age, education, cultural participation, income, district, Mixed/Arab, cosmopolitanism, (family importance, Recognized/Unrecognized, gender, employment), Gender Equality.	R <sup>2</sup> =0.176 Income, religion, (district, employment, cosmopolitanism, gender, Recognized/Unrecognized).	R <sup>2</sup> =0.08 Religion, cosmopolitanism, (age, employment, district, cultural participation, friends' importance).	R <sup>2</sup> =0.098 Income, employment, district, (gender, religion, Recognized/Unrecognized, friends' importance, age, education).	R <sup>2</sup> =0.162 Cultural participation, cosmopolitanism, age, Mixed/Arab, (income, district, employment, gender, friends' importance).	R <sup>2</sup> =0.23 Cosmopolitanism, gender, education, (age, religion, family importance, friends' importance, Mixed/Arab).	R <sup>2</sup> =0.276 Religion, cosmopolitanism, district, family importance, education, (Mixed/Arab, employment, income, friends' importance).

Table 3. Summary of regression results. (Bold factor added at least 0.01 to the model explanation)



Arab-Palestinian society in Israel as well as the role played by cultural factors in comparison to demographic one. Diffusion and adoption were examined by measuring different aspects of Internet access and use: access, nature of access (duration of access, and use locations,) and nature of use (variety of use, type of use and language/s used when surfing).

Access and use have grown rapidly over the last decade within the studied population, with use in 2007 nearly double the rate in 2002. The rate of home Internet access has increased every year, and has accelerated since 2009. The vast majority of Internet users have home Internet connections. According to Rogers (Rogers, 2003), the Arabs in Israel are at the beginning of the "late majority" stage, which approaches the 70%. These findings can be interpreted in light of developments in the Israeli context and in the Arab world. In Israel, competition among the different ISPs has driven down connection costs. Moreover, since 2004 the competitors begun seeking customers in the Arab sector by placing advertisements in local media which accelerates again in 2009. More and more, teachers are required to use the Internet and are asking their pupils to use it as well. Education is greatly valued by Arabs in Israel as an opportunity to enhance their socioeconomic status. Hence, supporting pupils by offering them the Internet as an educational tool can have a major impact on parents' decisions. An additional important change is related to Internet content. Since 2003, several local Arab websites have gone online. These websites are strongly related to daily life in Arab Israeli society. In addition, in the last three years many Arab websites that are villages or town specific, dealing especially with peoples local issues, grown rapidly something that was rare before. This brought the Internet into the public discourse and likely raised awareness of the importance of the Internet. Arabic language and Islamic content are much more available now, enabling surfers to find culturally suitable contents and to go beyond political borders and local religions. All these mentioned factors have had an effect on access and use, especially among younger educated people, who seem to be more willing and able to adopt new innovations.

A comparison of the data from 2007 to those from 2004 reveals that the home as the main location has risen from 57.2% (Ganayem, Rafaeli & Azaiza, 2009) to 90%. Concurrently, the main locus of use in other locations has decreased: work, from 20.2% to 8.2%, and educational setting, from 17.8% to 6.9%. Users who could not afford an Internet connection in the past can now afford one and consequently now use the Internet mainly at home. The decrease in workplace use and the low general access from workplaces indicate a serious lack of opportunities for Arabs to use the Internet at work. A comparison of these results to the findings from 2004 (Ganayem, Rafaeli & Azaiza, 2009), shows similarity among all segments of Israeli society for Internet use in educational settings. But for all other locations, Internet use among Arabs is lower than the general state-wide rate, and lower than Rafaeli's (2009) findings among the Arabs in his sample, probably due to the small Arab sample in the survey. Arabs in Israel apparently surf much less from Internet cafés (4.7%) than in Arab countries, where use rates for Internet cafés are reportedly high (Abdulla, 2007; Wheeler, 2006).

Most users are moderate in their use variety, using the Internet for three or four purposes ( $ME=3.5$ ,  $Range=1$  to  $6$ ). Use variety was also studied by Dijk (2005), who examined diversity of application use as an important facet of the digital divide. The Pew survey found that users who had been using the Internet for more than three years used the most Internet applications (Howard, Rainie & Jones, 2002). Measurements of variety of use were difficult to find in the literature, and the current study appears to be pioneering in that respect.

The Internet offers different tools and content types, and many studies have focused on the use of different tools and purposes by different groups. Most users made approximately equal use of the Internet for knowledge and entertainment purposes, with a slight advantage for knowledge purposes. Nearly 50% reported surfing news sites, about 70% of users play online games when surfing, and nearly 30% reported that games were their main Internet use. About one-third of users reported using chat and IM services. These findings are similar to Rafaeli's (2009) Israeli findings: Israelis are heavy IM (56.5%) and game

(68.5%) users. Arabs' frequent use of the Internet for games, chats and entertainment is similar to the pattern found among African-Americans, which reflects a cultural emphasis on interpersonal communication as well as a way to overcome the limitations of their daily life and social gaps between them and the majority in the state (Cooper & Kimmelman, 2001; Nakamura, 2004).

In real life, Arabs have low rates of participation in leisure time activities because of a lack such activities in their vicinity (Haas, Katz & Schiff, 2000). It is possible that surfers view virtual life, with its entertainment tools, as an alternative to the lack of actual activities.

Arabs in Israel are among the highest in world in using the Internet for educational and study purposes. Many users reported using the Internet for study-related purposes. In the World Internet Project (WIP), more than 70% went online for study-related work on a weekly basis, while in Israel 42% of the participants reported weekly surfing for study-related purposes (World Internet Project: International Report 2009 (2009). Using the Internet for work purposes is important in enhancing self-status. This type of use is relatively low among Arab Israelis (14%), compared to an average of about 25% in the WIP report as well as in Israel and nearly 43% in the US.

Languages used when surfing are an important cultural indicator among Arabs in Israel. Their mother tongue is Arabic, the most commonly used language in the state is Hebrew, and the dominant language of the Internet is English. An examination of the main language used when surfing the Internet shows that most users surf primarily in Arabic (69.9%), followed by Hebrew (26.7%), then English and other languages (3.4%). Bilingualism in Internet use among Arabs living in Israel reflects the different circles of their identity: the local context when surfing Arab local sites, the country level when surfing in Hebrew, the Arab world when surfing global sites in Arabic, and finally as global residents in the virtual world by surfing English sites. It seems that the Internet has enhanced the bilingualism and biculturalism in the traditional media that Smootha (1989) studied.

Wide digital gaps were found within the Arab society, almost on all demographic and cultural factors. In general,

age and education were the best predictors of Internet access and use, as younger and more educated participants were most likely to be connected to and use the Internet. Income was found to be the main factor affecting connection duration and frequency of use. Many studies have discussed the gaps based on demographic and/or cultural factors, and no clear conclusion can be drawn regarding the real factors causing such divides. It is important to note that this study found cultural factors to be with weak impact on Internet access and use in comparison to demographic factors. While cultural factors were found to have an impact on the way the Internet was used.

Education is an important value for Arabs in Israel. Thus, integrating the Internet into the educational system can broaden its integration into everyday life. Elementary schools in particular should include Internet use in their curricula, since an early start can enable students to achieve greater proficiency and more knowledge-directed use. This could also encourage parents to facilitate Internet access and use at home, and to enroll in courses to enhance their Internet skills.

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## ABOUT THE AUTHOR

Dr. Asmaa, N. Ganayem is Head of the academic courses at the TEC center in addition to be head of the Technological Center at the Al-Qasemi College of Education in Baka-Al-Garbiyah (an Arab city in Israel) and a lecturer in computer science. She has led different technological initiatives, conferences and multicultural activities at Al-Qasemi College, Arab schools, in hospitals and in the Arab society in Israel as well as in the Mofet institute. She received her PhD from Haifa University on the use of the Internet within the Arab population in Israel.

